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Adoption and Implementation of Micro-Credentials in Indian Higher Education: Opportunities, Challenges, and Policy Implications

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ABSTRACT

This paper aims to examine the adoption and implementation of micro-credentials in Indian higher education within the context of evolving skill demands and digital transformation. Positioned as short, competency-based learning modules, micro-credentials are gaining global traction as tools to enhance employability and support lifelong learning. The study follows a descriptive qualitative research design based on thematic analysis of secondary sources, including policy documents, empirical research, and institutional reports. Findings reveal increasing policy support in India through NEP-2020, the National Credit Framework (NCrF) and the Academic Bank of Credits (ABC), which enable flexible, credit-based learning pathways. However, implementation remains limited due to challenges such as low institutional readiness, inadequate digital infrastructure, limited employer recognition, and the absence of standardisation frameworks. The study argues that micro-credentials should complement rather than replace traditional degrees, offering targeted skill enhancement aligned with industry needs. The paper concludes by recommending capacity-building initiatives, national quality assurance standards, strengthened industry partnerships, and context-specific pilot models to support scalable adoption. The review highlights significant implications for higher education reform, workforce preparation, and policy design in India.

***Keywords**: Micro-Credentials, Higher Education, NEP-2020, Employability, Digital Learning, Academic Bank of Credits, Digital Badges.*

Introduction

Higher education globally is undergoing rapid transformation, driven by factors such as digitalisation, globalisation, changing labour-market expectations, and a rising demand for lifelong learning. As workplaces evolve under the influence of new technologies, including artificial intelligence, automation, and data analytics, traditional degree-based qualifications, although still valuable, are increasingly perceived as insufficient to prepare graduates with the rapidly evolving competencies required in today's job market (Varadarajan et al., 2023; Ha, 2023). In response to these shifts, micro-credentials have gained significant attention as a flexible, short-term, competency-based learning modality designed to certify specific skills or competencies rather than broad academic knowledge (Ahsan, 2023; Gamage, 2025).

Micro-credentials allow learners to acquire targeted skills through short courses or modular programmes delivered via online or blended modes, and verified through digital badges, certificates or credit-based recognition. They are typically stackable, portable, aligned with industry demands and responsive to rapidly emerging skill-needs (Gamage, 2025; Varadarajan et al., 2023). Many countries—including Australia, New Zealand, Ireland, Canada and the United States—have already taken steps to

integrate micro-credentials into national qualifications frameworks, thereby enabling learners to accumulate micro-credits which may contribute toward larger formal qualifications (Ha, 2023; Ahsan, 2023).

In India, higher education reforms under the National Education Policy 2020 (NEP 2020) emphasise skill development, flexibility, multidisciplinary learning and credit mobility. The introduction of frameworks such as the National Credit Framework (NCrF) and the Academic Bank of Credits (ABC) has created a structured mechanism for stacking and transferring credits earned through micro-credentials. These reforms signal a shift from traditional, degree-centric education to more personalised, competency-based learning pathways aligned with employability and industry expectations. Although the notion of micro-credentials in the Indian context is relatively new, there is growing interest among universities, policymakers, the ed-tech industry and employers (Gamage, 2025).

Despite the supportive policy environment, actual implementation in Indian higher education remains limited and uneven across institutions. The literature indicates that while awareness is expanding, issues such as recognition, standardisation, digital infrastructure and faculty readiness continue to hamper adoption (Varadarajan et al., 2023; Ha, 2023). Hence, there is a need to explore the current status of micro-credential adoption in Indian higher education, identify opportunities and challenges, and assess policy implications for sustainable implementation.

Given the growing policy support yet limited institutional implementation in India, it becomes essential to examine existing studies on micro-credentials, both globally and within the Indian higher education context. A review of the literature enables identification of prevailing themes, adoption trends, opportunities, and challenges shaping their implementation, and helps in positioning the present study within the ongoing academic debate.

Review of Literature

- **Concept and Evolution of Micro-Credentials**

Micro-credentials are generally characterised as short, focused learning experiences designed to certify specific skills or competencies and may stand alone or be stacked toward larger credentials (Ha, 2023). These credentials typically incorporate evidence-based assessment mechanisms and are often represented digitally via badges or certificates, thereby enabling portability and verification across platforms and institutions (Ahsan, 2023). According to Wheelahan and Moodie (2021), micro-credentials align more closely with labour-market requirements and support lifelong learning, upskilling and reskilling—particularly important in economies undergoing rapid technological transformation. Although the concept is evolving, the body of literature reflects increasing interest in how micro-credentials supplement or complement traditional academic programmes.

- **Global Adoption Trends**

Worldwide, micro-credentials have gained traction as a response to the persistent skills mismatch between higher-education graduates and employer expectations (Oliver, 2020). Digital-learning platforms such as Coursera, edX and Future Learn partner with universities to offer credentialed modules that adults, working professionals and even non-traditional learners can access (Tamoliūnė& Milos, 2022). Recent systematic reviews indicate a marked increase in publications and global interest: Ha et al. (2022) found only a handful of empirical studies pre-2020, while more recent research shows growth in cross-regional collaborations and stakeholder analysis. Varadarajan, Koh & Daniel (2023) identify key stakeholder groups—learners, employers, institutions, government—and highlight the complex ecosystem in which micro-credentials operate. The emergent literature emphasises features such as stackability, portability, shorter duration, online/blended delivery, and industry alignment across jurisdictions.

- **Micro-Credentials vs. Traditional Degrees**

A recurring thread in the literature compares micro-credentials with traditional degree programmes. Traditional degrees provide broad foundational knowledge and long-term credentials, whereas micro-credentials offer highly targeted, short-term modules focused on particular competencies (Gamage, 2025). This difference creates both opportunities and tensions: on one hand, micro-credentials may enhance flexibility and responsiveness; on the other hand, concerns persist regarding legitimacy, recognition and equivalence (Varadarajan et al., 2023). Some scholars argue that micro-credentials are not intended to replace degrees but rather to supplement them, offering “just-in-time” learning for specific skills gaps (Ha et al., 2022). However, the value proposition depends heavily on whether employers and

academic institutions recognise such credentials, how they integrate into credit-frameworks, and how quality is assured (Ahsan, 2023).

- **Role in Employability and Skill Development**

With the rapid pace of change in technologies and industries, higher-education institutions face pressure to produce graduates who are job-ready, adaptive and continuously learning. Micro-credentials can serve as one mechanism for upskilling and reskilling selected cohorts—working professionals, industry-change workers, or even full-time students seeking specific competencies (Tamoliūnė& Milos, 2022). For example, micro-credentials allow learners to add tailored credentials in areas such as data analytics, digital pedagogy, AI tools or project-management without undertaking a full degree (Gamage, 2025). Research shows that learners value the flexibility and immediacy of such credentials, while institutions view them as a way to diversify offerings and engage new learner markets (Varadarajan et al., 2023). However, a recurrent challenge is employer understanding and recognition of micro-credentials—if employers do not value them or cannot interpret what they certify, the employability benefit may be limited (Ha, 2023).

- **Micro-Credentials in the Indian Context: NEP-2020, NCrF, UGC Guidelines**

In India, the publication of the National Education Policy 2020 (NEP 2020) marked a major reform pointing toward flexibility, multidisciplinary education, credit mobility and lifelong learning. The policy's emphasis on multiple entry-exit options, stackable credentials and recognition of prior learning creates fertile ground for micro-credentials. The proposed National Credit Framework (NCrF) and the Academic Bank of Credits (ABC) provide mechanisms by which micro-credits can be stored, transferred or counted toward degrees. The University Grants Commission (UGC) in its draft guidelines for skill-based courses and micro-credentials recommends that higher-education institutions offer micro-credentials via online, blended or face-to-face modes, with clearly defined credit hours and assessment criteria (UGC, 2023). Early reports in Indian media assert that many institutions are exploring micro-credential options and that industry-ready skill sets are increasingly seen as priorities (Economic Times Education, 2025). Nonetheless, to date, adoption remains selective and uneven across colleges, and the literature notes that many Indian institutions are still in pilot or planning phases (Ha, 2023; Ahsan, 2023).

- **Awareness, Perception and Acceptance Studies**

Empirical studies on micro-credentials reveal that awareness among learners, faculty and institutions varies widely. Ha et al. (2022) in their systematic review found low levels of institutional readiness and learner familiarity with micro-credential concepts. Ahsan (2023) highlights that institutional implementation often suffers from inadequate technical infrastructure, unclear recognition pathways, faculty resistance and uncertainty among students about the value of credentials. Varadarajan et al. (2023) further show that stakeholder perception of micro-credentials diverges: learners favour short, flexible, practical modules; institutions emphasise accreditation and market positioning; employers want transparent competency indicators. These varying perceptions point to acceptance as a key determinant of successful implementation. In the Indian context, anecdotal reports suggest faculty in many colleges perceive micro-credentials as extra burden or as lacking in academic prestige; students may view them as add-ons rather than fully recognised credentials, and industry recognition remains nascent (Gamage, 2025). Therefore, research emphasises the importance of bridging perception gaps and aligning stakeholder expectations.

- **Summary of Gaps and Emerging Research Directions**

Despite the growing body of literature, several gaps remain. Many studies underscore that micro-credential implementation is still in early stages globally and particularly in developing contexts (Ha et al., 2022). There is limited empirical evidence on long-term outcomes—such as learner employment outcomes, credit-stacking progression to full degrees, and cost-effectiveness (Ahsan, 2023; Tamoliūnė& Milos, 2022). In India, specific research on micro-credentials within the college sector (rather than universities) is sparse, and little is known about region-wise institutional readiness, faculty perceptions, and alignment with industry in the Indian context. The intersection of micro-credentials with AI-driven learning, digital infrastructure, and equity issues in India also remains underexplored. Future research is thus encouraged to focus on multi-stakeholder studies, longitudinal tracking of outcomes, cost-benefit analyses, and comparative case studies across institutions.

Overall, the review of literature reveals that although micro-credentials hold strong potential to enhance employability and support skill-based learning, research on their systematic adoption and

implementation in Indian higher education remains limited. Therefore, the present study seeksto critically explore the adoption and implementation of micro-credentials within Indian higher education, examining their role, effectiveness, and potential future impact. It investigates the extent to which higher education institutions are integrating micro-credentials into their academic and administrative frameworks and analyses the emerging opportunities these short, skill-focused learning pathways offer for students, teachers, and institutions striving to remain relevant in a rapidly evolving knowledge economy. The paper further examines the major challenges and barriers that hinder successful implementation, including issues related to institutional readiness, digital infrastructure, quality assurance, and employer recognition. In addition, it evaluates the policy measures and strategic interventions required to strengthen micro-credential integration and ensure sustainable, equitable, and meaningful adoption across diverse institutional contexts. Through this exploration, the study aims to deepen understanding of micro-credentialing within the Indian higher education landscape and to contribute practical recommendations for educational leaders and policymakers engaged in transforming the higher education system to meet contemporary skill and industry demands.

Objectives of the Study

- To examine the current status and extent of adoption and implementation of micro-credentials in Indian higher education institutions.
- To analyse the perceived opportunities, benefits, and employability potential associated with micro-credentials.
- To identify the key challenges and barriers affecting institutional implementation and stakeholder acceptance.
- To evaluate policy frameworks, regulatory support, and institutional readiness for integrating micro-credentials.
- To propose evidence-based recommendations and strategies for strengthening the adoption of micro-credentials in India.

Research Methodology

The present study employed a descriptive qualitative research design grounded in a conceptual review approach. Because the focus is on understanding the adoption and implementation of micro-credentials in Indian higher education, the study did not collect primary empirical data but instead relied on secondary data sources. These sources included peer-reviewed journal articles, policy documents (including those of the University Grants Commission [UGC]), government reports, conference proceedings, and expert commentaries discussing the design, delivery, accreditation, and outcomes of micro-credential programmes internationally and in India (Ahsan, 2023; Ha, 2023).

A thematic analysis methodology was used to systematically code and synthesise information from those documents. Themes were derived around five major constructs: (1) status of adoption and implementation, (2) perceived benefits and opportunities, (3) implementation challenges and barriers, (4) policy and institutional readiness, and (5) recommendations and strategies for strengthening micro-credentials implementation in India.

Findings

Based on the objectives of the study, the findings are presented thematically as follows:

- **The current status and extent of adoption and implementation of micro-credentials in Indian higher education institutions**

In the global context, micro-credentials have experienced significant uptake, but India's experience is still emergent. Premier institutions—including select Indian Institutes of Technology (IITs) and Central Universities—have begun offering credit-linked micro-credentials in collaboration with major Ed-Tech platforms and industry partners (Education Times, 2025). For example, India's policy environment under the National Education Policy 2020 (NEP-2020) and the National Credit Framework (NCrF) facilitates their integration into degree structures. Nonetheless, for the majority of state universities, private colleges and smaller institutions, implementation remains at the pilot or planning stage (IPSRSolutions, 2025). Moreover, adoption has been disproportionately concentrated in STEM and professional disciplines, whereas fields such as teacher education, arts and social sciences have seen limited micro-credential activity.

- **The perceived opportunities and benefits associated with micro-credentials**

The literature identifies multiple key benefits associated with micro-credentials. First, they appear to enhance employability by offering job-relevant and industry-aligned skills, addressing the mismatch between traditional degree curriculum and industry demand (Online Manipal, 2024). Second, they are effective in bridging skills gaps by facilitating academia-industry collaboration and building practical competencies beyond theoretical knowledge (ELET Digital Learning, 2025). Third, micro-credentials provide flexibility and promote lifelong learning: they enable learners (especially working professionals) to up-skill or re-skill without committing to full-length degree programmes (CDPP, 2024). Fourth, digital and blended delivery formats support innovation in pedagogy and assessment, making education more accessible and responsive (Ahsan, 2023). Lastly, the stackability and portability of micro-credentials—when integrated with frameworks like the Academic Bank of Credits (ABC)—allow learners to accumulate learning modules and potentially convert them into formal credentialing (UGC, 2024).

- **The key challenges and barriers affecting institutional implementation and stakeholder acceptance**

Despite the promise, the literature also surfaces several significant barriers. One major challenge is limited institutional readiness—many higher education institutions have low awareness of micro-credential frameworks, inadequate faculty training, and insufficient institutional capability for design and delivery (Varadarajan et al., 2023). A second barrier is the infrastructure gap, particularly digital infrastructure and access in rural or remote colleges, which impedes online/blended delivery of micro-credentials (IPSRSolutions, 2025). A third concern relates to employer recognition: many industries still lack clarity about what micro-credentials represent in terms of competency, making it difficult for graduates to derive full employability benefit (Online Manipal, 2024). Fourth, standardisation is lacking—there is no consistent model across institutions for credit-value, duration, learning-outcome mapping, or assessment mechanisms (Ha, 2023). Finally, cultural resistance to change persists: faculty and institutions accustomed to traditional degree programmes may view micro-credentials as an additional burden or as undermining academic prestige.

- **Policy frameworks, regulatory support, and institutional readiness for integrating micro-credentials**

At the policy level, India shows a strong orientation toward micro-credential adoption. The NEP 2020 emphasises flexibility, lifelong learning and skill-based education, while the NCrF and the ABC provide structural mechanisms for credit accumulation and transfer. Importantly, the UGC's *Guidelines for the Introduction of Skill-Based Courses and Micro-Credentials in HEIs* articulate eligibility, credit-allocation, and assessment frameworks (UGC, 2024). However, even though policy support is robust, institutional readiness remains inconsistent: many colleges lack implementation road maps, faculty training, and resources required to operationalise these policies. The gap between policy intention and on-ground practice continues to be a critical issue.

- **Recommendations and strategies for strengthening micro-credential implementation in India**

Informed by the above findings, the literature points to several strategic recommendations: Conduct awareness and capacity-building programmes for faculty and administrators; invest in digital infrastructure especially in rural/Tier-II and Tier-III institutions; develop national standardisation frameworks for micro-credential design, accreditation, assessment and credit-transfer; strengthen partnerships between industry and higher education to ensure alignment with employer needs; extend micro-credentials beyond STEM disciplines into teacher education, social sciences and arts; and promote empirical research through pilot-programmes to document outcomes and best practices (Education Times, 2025; CDPP, 2024).

The findings of the study suggest that micro-credentials hold **transformative potential**for Indian higher education by enabling flexible, modular, competency-based learning aligned with workforce requirements. Yet, the transition from a traditional degree-centric system to one infused with micro-credentials is still nascent and uneven (Ha, 2022; Ahsan et al., 2023). The study reveals a rich debate: while some scholars enthusiastically champion micro-credentials, otherscaution that without robust institutional, industry and regulatory frameworks, they may exacerbate existing inequities or become superficial badges rather than meaningful credentials.

Discussion

The findings of this review indicate that micro-credentials are rapidly emerging as a relevant and strategic component of Indian higher education, particularly in response to evolving workforce demands and the need for continuous professional development. Evidence suggests that micro-credentials can support upskilling, reskilling, and lifelong learning, offering flexible and competency-based pathways that align closely with industry expectations and the dynamics of a digital economy (Gamage, 2025; Wheelahan& Moodie, 2021).

Although India has established a supportive policy environment through initiatives such as NEP-2020, the National Credit Framework (NCrF), and the Academic Bank of Credits (ABC), the translation of policy into practice remains uneven. Institutional readiness varies widely, especially between premier universities and smaller institutions, where challenges related to digital infrastructure, faculty capacity, and administrative frameworks continue to hinder implementation (Ha, 2023; Varadarajan et al., 2023). Limited employer awareness and the absence of a uniform national standard also constrain the credibility and recognition of micro-credentials, affecting their perceived value.

A critical concern noted across literature is the potential risk of fragmenting learning if micro-credentials are treated as isolated skill units without integration into broader educational outcomes. Scholars warn that poorly designed or unregulated micro-credentials may lead to credential inflation, compromising the academic integrity of higher education (Ralston, 2020; Ha et al., 2022). Hence, the consensus is that micro-credentials should complement rather than replace traditional degrees, functioning as extensions that enrich academic programmes and strengthen employability without compromising holistic learning (Wheelahan& Moodie, 2021; OECD, 2021).

The successful scaling of micro-credentials in India requires coordinated strategic efforts. Key priorities include strengthening institutional capability, establishing national quality assurance and accreditation frameworks, fostering sustained industry partnerships, and investing in digital infrastructure to ensure equitable access (Strielkowski, 2025; CDPP, 2024). Addressing these structural requirements is essential, particularly for rural or resource-constrained colleges, where digital divides may restrict participation and widen educational inequalities.

Overall, the review highlights that micro-credentials have transformative potential for the Indian higher education system by promoting flexibility, innovation, and employability-driven learning. However, their long-term impact will depend on thoughtful implementation, stakeholder acceptance, and evidence-based policy execution. With systematic planning and institutional commitment, micro-credentials can contribute to a more responsive, future-ready, and globally competitive higher education ecosystem in India.

Educational Implications

The findings of this study carry important implications for transforming the Indian higher education landscape through meaningful integration of micro-credentials. For policymakers, the results highlight the need to establish clear national standards for accreditation, quality assurance, credit transfer, and employer recognition to ensure credibility, transparency, and equitable access. For higher education institutions and educators, the implications underscore the importance of strengthening institutional readiness through investment in digital infrastructure, faculty capacity-building, and thoughtful curriculum integration rather than positioning micro-credentials as isolated add-on courses. For students and employers, increased awareness and collaboration are essential to support informed participation and recognition of competency-based learning. Finally, the study identifies the need for continued empirical research through pilot models, stakeholder perception studies, and evaluation of long-term learning and employment outcomes to guide evidence-based implementation and policy refinement. Collectively, these implications emphasise that well-planned integration of micro-credentials can significantly enhance employability, foster lifelong learning, and strengthen industry-academia partnerships.

Conclusion

The study concludes that micro-credentials represent a timely and transformative innovation in Indian higher education, enabling flexible, modular, and industry-aligned learning to enhance employability and support lifelong learning. Although national reforms such as NEP-2020, the NCrF and the Academic Bank of Credits provide a strong enabling framework, implementation across institutions remains uneven due to limited institutional readiness, digital inequalities, low employer recognition, and

the absence of standardised quality-assurance mechanisms. Strengthening digital infrastructure, building faculty capacity, establishing national standards, and fostering robust industry partnerships are critical to expanding sustainable adoption. This research contributes to the evolving discourse on educational reform by underscoring the need for coordinated efforts among policymakers, institutions, and industry stakeholders. With strategic execution and evidence-based policy development, micro-credentials have the potential to bridge the skills gap, democratize learning, and enhance India's global competitiveness in a rapidly changing knowledge economy.

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